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(54) **Vehicle exterior mirror system with signal light**

Fahrzeugaussenspiegel mit Signalleuchte

Rétroviseur extérieur de véhicule avec feu de signalisation

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Description

[0001] This invention relates generally to an exterior mirror system for a vehicle.

[0002] US 5,669,705 discloses an exterior mirror system for a vehicle comprising: an exterior mirror assembly including a reflective element, a housing for said reflective element, and a positioning device for adjustably positioning said reflective element in said housing, said exterior mirror assembly being adapted to mount to the vehicle, and said exterior mirror assembly further including at least one signal light, said signal light having at least one light source and a light conduiting member, said light conduiting member being oriented for facing at least rearward of the vehicle and being adapted to project a pattern of light from said exterior mirror assembly and to restrict light from extending into the vehicle so that a driver seated in the vehicle does not directly observe said pattern of light, said pattern of light extending at least rearwardly and laterally from the vehicle to provide a side marker for the vehicle.

[0003] The present invention provides an exterior mirror system for a vehicle characterised in that said light conduiting member includes a plurality of light conduiting portions spaced and arranged in a generally radial fashion, each of said light conduiting portions including a leading edge defining a light input surface receiving light from said at least one light source, each of said light conduiting portions having an outboard end defining a light emitting surface and said outboard ends following the contour of said housing.

[0004] A preferred embodiment of the present invention is intended to provide a personal safety feature for a vehicle in the form of a floodlight adapted to projecting light generally downwardly on an area adjacent a portion of the vehicle in order to create a lighted security zone in the area. Advantageously, the floodlight is preferably positioned in the housing of an exterior mirror having a reflective element also positioned in the housing. According to an aspect of the invention, an actuator is provided for the floodlight including a base unit in the vehicle and a remote transmitter. The base unit is responsive to a signal from the remote transmitter in order to actuate the floodlight. This allows the vehicle operator to actuate the floodlight from a distance in order to establish the security zone prior to approaching the vehicle.

[0005] Preferably, an actuator for the floodlight includes a lockout device in order to prevent actuation of the floodlight during operation of the vehicle.

[0006] Preferably, the floodlight is adapted to project a pattern of light from the housing on an area adjacent a portion of the vehicle that extends laterally onto the vehicle and downwardly and rearwardly of the vehicle. In this manner, a security zone is established from the vehicle door to the rear of the vehicle. The signal light is adapted to projecting a pattern of light extending laterally away from the vehicle and rearwardly of the vehicle. In this manner, the pattern generated by the signal

light cannot be substantially observed by a driver of the vehicle. However, the pattern generated by the signal light may be observed by a driver of another vehicle passing the vehicle equipped according to the invention.

[0007] The floodlight and signal lights may be generated by a light emitting diode positioned in the housing, a vacuum fluorescent lamp positioned in the housing, an incandescent lamp positioned in the housing or a light source in the vehicle and a light pipe between the light source and the mirror housing.

[0008] By providing a lighted security zone adjacent the vehicle, users can observe suspicious activity around the vehicle. The pattern of light generated by a security light according to a preferred embodiment of the invention establishes a security zone around, and even under, the vehicle in the important area where the users enter and exit the vehicle. The provision for remote actuation of the security light provides a deterrent to ward off persons lurking around the protected vehicle while the users are still at a safe distance from the vehicle. The provision for a lockout circuit ensures that the security light will not inadvertently be actuated while the vehicle is in motion. Preferred embodiments of the invention, further, conveniently combine a signal light that acts in unison with the vehicle's turn signal, brake light, or both, with the security light in an exterior mirror assembly. The signal light may be designed to be observed by other vehicles passing the equipped vehicle but not directly by the driver of the equipped vehicle.

[0009] Preferably, the pattern of light comprises an amber colored light to provide a signal.

[0010] Preferably, the light conduiting member includes a plurality of light conduiting portions with each including a light input surface and a light emitting surface and first and second side walls. The side walls provide internal light reflecting surfaces and direct light from the light source through the light conduiting portions and through said light emitting surfaces. In preferred form, the signal light includes a plurality of light sources, with each being associated with the light conduiting portions.

[0011] In other aspects, the light conduiting member includes a first side, a first end, and a second side. The first side defines the light emitting surface and is positioned for facing outward from the housing. The first end defines the light input surface. The second side defines a plurality of internal reflecting surfaces which are arranged to reflect the light from the light source through the first side of the light reflecting member and in the light pattern. In further aspects, the light pattern includes a plurality of light regions, with each of the light regions having a first leading edge generally parallel with the vehicle and a second leading edge generally angled away from the vehicle. For example, the internal reflecting surfaces may comprise generally angled planar surfaces provided on the second side of the light conduiting member.

[0012] In another aspect, the exterior mirror system includes a second light conduiting member which is po-

sitioned in a front facing portion of the housing wall of the exterior mirror assembly and directs light at least forwardly of the vehicle. Preferably, the second light reflecting member wraps around an outer portion of the housing wall for directing light laterally with respect to the vehicle.

[0013] In other aspects, the signal light includes a housing, which includes a recessed portion defining a curvilinear wall. The light source is positioned in the recessed portion, and the reflector is positioned along the curvilinear wall. Light emitted from the light source is directed outwardly from the light module and forwardly, rearwardly, and laterally of the vehicle and is restricted from extending into the vehicle so that the driver seated in the vehicle does not directly observe the light pattern.

[0014] Preferably, the exterior mirror assembly includes a powerfold exterior mirror system. The powerfold exterior mirror system includes a folding portion and a non-folding portion, with the non-folding portion being adapted to mount to the vehicle, and the folding portion including a reflective element and being adapted to move between a normal viewing position and a folded position. At least one security light is substantially positioned in either the folding portion or the non-folding portion, which is adapted to project a pattern of light from the exterior mirror assembly to create a lighted security zone in an area adjacent the vehicle.

[0015] In one aspect, the security light is positioned in the folding portion of the exterior mirror assembly. In further aspects, the exterior mirror assembly further includes an actuator, which adjusts the position of the security light in the folding portion when the folding portion moves to its folded position whereby the orientation of the lighted security zone remains substantially unaffected by the movement of the folding portion.

[0016] It can be appreciated from the foregoing that the exterior mirror system of the present invention permits an approaching vehicle to observe an actuated signal light without the interference from headlights or brake lights. The exterior mirror system may include a unitary module, which is easily installed or removed for repair, or a signal light assembly which is incorporated into the housing of the mirror assembly.

[0017] Preferred embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of an embodiment of the exterior rearview mirror assembly of the present invention;

Fig. 2 is an exploded perspective view of a signal light of Fig. 1;

Fig. 2A is a front elevation of a light source of the signal light of Fig. 2;

Fig. 2B is a side view of the light source of Fig. 2A;

Fig. 3A is a plan view of a second embodiment of the signal light of Fig. 2;

Fig. 3B is a plan view of a third embodiment of the

signal light of Fig. 2; and

Fig. 4 is a perspective view of a signal light module incorporating a security light.

[0018] Referring to Figs. 1-2, the numeral 410 designates an embodiment of the exterior rearview assembly of the present invention. Exterior rearview assembly 410 includes a mirror casing or housing 412, which includes a sail 413 which is adapted to mount on a vehicle, a reflective element 414 which is supported in housing 412, and a signal light 416 which is also supported in housing 412. Signal light 416 is adapted to direct light forwardly and rearwardly of the vehicle so that vehicles approaching from the opposite direction of the vehicle and rearwardly of the vehicle may observe signal light 416. Additionally, signal light 416 is adapted to project light laterally with respect to the vehicle to provide a side light and so function as a side marker. Signal light 416 is preferably adapted to direct the signal light in a light pattern 417 such that the light does not extend into the cabin of the vehicle to distract the driver of the vehicle. Furthermore, by projecting light rearwardly, forwardly and laterally from the side of the vehicle, approaching vehicles, whether from the forward direction of the vehicle or from the rearward direction of the vehicle or vehicles that are entering the blind spot of the vehicle, can observe the signal light and have advanced notice if the driver of the vehicle intends to make a lane change or turn.

[0019] Rearview mirror assembly 410 may comprise a fixed position exterior rearview mirror assembly or may comprise a break-away rearview mirror assembly, which moves between normal operating position in which the rearview mirror assembly is extended from the vehicle to a folded position against the body of the vehicle and the exterior rearview mirror assembly 410 is impacted with sufficient force. Examples of break-away rearview mirror assemblies are well known.

[0020] Housing 412 is generally cup-shaped and includes a rearwardly facing opening 412a in which reflective element 414 is supported. Casing 412 is preferably injection molded from a suitable plastic, such as nylon, acrylonitrile butadiene styrene (ABS) or suitable resinous plastic, or the like, which is commercially available under the trademark TERLURAN KR2889 ®, by BASF Company of Wyandotte, Michigan. Alternately, other resinous, melt processible plastics or moldable materials such as mineral-filled or glass filled nylon or polyester and polypropylene could be used to form case 412. A suitable nylon is 13% glass modified nylon 6:6 sold as ZYTEL 71G13L ® by I.E. DuPont de Nemours & Company of Wilmington, Delaware, or PA123G13BK-47 by Bay Resins Inc. of Millington, Maryland. A suitable polypropylene is TENITE P6M4Z-007 ® by Eastman Chemical Products, Inc., Kingsport, Tennessee. Alternately, casing 412 may comprise a fiber reinforced nylon plastic, thermoplastic, or polypropylene or other similar thermoplastic or thermoset materials. As described above, reflective element 414 is supported in housing 412. Pref-

erably, reflective element 414 is mounted on a backing plate 414a, which in turn is supported by a positioning device, for example an electrical actuator or the like.

[0021] As best seen in Figs. 1 and 2, signal light 416 is preferably positioned in a lower portion or bottom rim of casing 412 and includes a light conduiting member or light pipe 430 and a plurality of light sources 432. The light emitted from the signal light 416 is preferably yellow, amber, yellow-amber, or amber-red depending on its application. Light pipe 430 is preferably formed, such as by molding, from a plastic material, such as polycarbonate or acrylic or the like, and is, therefore, substantially rigid. As best seen in Fig. 2, light pipe 430 includes a plurality of light transmitting or conduiting portions 430a, which are spaced and arranged in a generally radial fashion. Each light transmitting or conduiting portion 430a includes a leading edge 434, which defines a light input surface. Furthermore, each light transmitting or conduiting portion 430a includes a distal surface or out-board edge 436 which defines a light emitting surface which is preferably arranged or formed, to follow the contour of exterior mirror housing 412. In addition, each light transmitting or conduiting portion 430a includes side walls 438 and 440, which extend from light input surface 434 outwardly toward light emitting surface 436 which define radially extending grooves or channels in light conduiting member 430. As best seen in Fig. 2, side walls 438 and 440 preferably terminate before reaching light emitting surface 436. Alternately, one or more light conduiting portions may include respective side walls 438 and 440 that extend from their respective light input surfaces 434 to their respective light emitting surfaces 436. In this manner, light pipe 430 comprises a plurality of discrete light transmitting or conduiting portions rather than a unitary light conduiting or transmitting member.

[0022] Light sources 432 are positioned and, preferably, optically coupled to light input surfaces 434 of each respective light transmitting or conduiting portion 430a. Referring to Figs. 2A and 2B, in the illustrated embodiment, light sources 432 comprise surface light emitting diodes (LED's) and preferably comprise a flat rectangular wafer 432a with a projecting emitter 432b, which are commercially available from the Piranha line of Hewlett Packard. In preferred form, each light input surface 434 includes a recess and, more preferably, a cylindrical groove 434a for receiving the respective light emitting portion 432b of the light source 432. In this manner, the light emitters 432b of the respective LED's may achieve good optical coupling with light input surfaces 434. Alternately, each of the respective light input surfaces 434 of light transmitting conduiting portions 430a may include a semi-spherical recess for receiving the respective light emitters of the light sources 432, which will maximize the optical coupling between light sources 432 and light conduiting portions. However, semi-spherical recesses are harder to tool and to assembly.

[0023] Light input surfaces 434 of each light transmitting or conduiting portion 430a are generally parallel or

only slightly angled with respect to its respective light emitting surface 436 such that the light emitted from the respective light source 432 will project outwardly from light emitting surface with minimal reflection inwardly from the light emitting surface. Furthermore, sides 438 and 440 are angled with respect to light input surface 434 such that light from light source 432 is internally reflected and redirected outwardly from light emitting surface 436. In so doing, light pipe 430 optimizes the internal reflection of each light transmitting or conduiting portion 430a to efficiently direct the light emitted from light source 432, which tends to project light in a cone shape light pattern, outwardly through light emitting surface 436.

[0024] Signal light 416 preferably comprises a module which is preferably removably inserted into a slotted opening or recess 412b formed in housing 412 of exterior rearview mirror assembly 410. Preferably, signal light 416 includes a lower housing portion 442 and an upper housing portion or cover 444. Upper housing portion 444 may be secured to lower housing portion 442 by conventional fasteners, for example fasteners, including screws, snap-fit couplers, or the like, such that light sources 432 are serviceable, or may be welded or adhered to housing 442, for example by sonic welding, heat staking, or an adhesive, so that signal light 416 can be replaced as a unit. Light conduiting member 430 is positioned in lower housing portion 442 and is preferably integrally molded with housing portion 442 such that light emitting surface or surfaces 436 of light pipe 430 form a portion of the outer perimeter wall 446. However, it should be understood that light conduiting member 430 may be separately formed from housing portion 442 and, instead, inserted into housing and positioned such that light emitting surface or surfaces 436 is optically coupled to perimeter wall 446.

[0025] In preferred form, lower housing portion 442 is formed or molded from a clear plastic, including for example polycarbonate, acrylic, or the like. In contrast, upper housing portion 444 may comprise any suitable plastic, for example a melt-processible plastic or moldable material. Furthermore, upper housing portion 444 may be opaque.

[0026] Each of the respective light sources 432 includes electrical wiring 447, which extends through housing 442 and through an opening 448 provided in perimeter wall 446 of housing 442. Optionally, perimeter wall 448 may include an electrical outlet or plug to which the electrical wiring is coupled for coupling to the electrical system of the vehicle. In addition, light sources 432 may be coupled to and powered by a circuit board mounted in housing 442, which is electrically coupled to the electrical system of the vehicle. Furthermore, light sources 432 may be powered by flexible circuitry, which is electrically coupled to the electrical system of the vehicle, or any other suitable conventional power supply system. Alternately, each individual wire may project from housing 442 for individually coupling to the electri-

cal system of the vehicle.

[0027] As best seen in Fig. 2, upper housing portion 444 includes one or more retaining clips 450 for securing to a corresponding structure provided in housing 412. In the illustrated embodiment, retaining members 450 comprises conventional bayonet or snap type couplers, but it should be understood that other couplers, such as threaded fasteners, or the like, may be used. As described in preferred form, light conduiting or transmitting portions 430a rely on internal reflections of the light emitted from light sources 432 to transmit or conduit the light from light source to light emitting surfaces 436. In this manner, light conduiting member 430 is easy to manufacture and assembly and relies on the geometry of the light input surfaces and side walls in order to produce an effective signal light 416 rather than reflections from reflective surfaces. However, it should be understood, that side walls 438 and 440 may include reflective surfaces, such as vacuum metalized surfaces or the like. However, this would entail additional manufacturing steps and require more careful handling of the article and, consequently, would increase the cost of the signal light 416.

[0028] Referring to Fig. 3A, signal light 416' may include bulb shaped light sources 432'. In a similar manner to signal light 416, light input surfaces 434' of light conduiting members 430' may include recessed portions 434a' for receiving the respective bulb shaped light emitters 432'.

[0029] As best seen in Fig. 3B, another embodiment 416" of signal light includes a single light source 432" such as a conventional light bulb to emit light for input into the respective light input surfaces 434" of each respective light conduiting portion 430a" of light pipe 430".

[0030] It should be understood from the foregoing, that light pipes 430, 430', and 430" are formed with respective side walls 438 and 440, 438' and 440', and 438" and 440" to guide the light from the respective light source or light sources 432, 432', 432", to the outboard edge 431, 431', 431" of light pipe 430 to form a signal light which directs light rearwardly, laterally, and forwardly of the vehicle. Whether light pipes 430, 430', 430" are formed as a single unit with a plurality of light transmitting or conduiting portions 430a, 430a', 430a", or as a collection of discrete light transmitting or conduiting portions, in which case discrete regions of light will be produced, signal lights 416, 416', and 416" provide simple and inexpensive light assemblies which are easy to manufacture and install.

[0031] It should be understood that should it be desired to vary the intensity of the signal lights so they are brightest during high ambient lighting conditions, such as on a sunny day, but so that they are dimmer when ambient conditions are lower, such as at night, the intensity of the signal lights can be modulated using a photosensor such as a photoresistor, photodiode, phototransistor, or their like. A photosensor that controls the intensity of the signal light so that it reduces its intensity

during low ambient light driving conditions, such as by pulse width modulation on the electrical line powering the LEDs in the signal light, may be mounted integrally with the signal light module itself, or it may be part of the vehicle electronics itself, such as a photosensor mounted as a part of an automatic electrochromic mirror circuit, as part of a vehicle automatic headlamp activation circuit, as part of a headlamp daylight running light control circuit, or their like.

[0032] The concepts of this invention are applicable to a variety of exterior vehicular mirror assembly constructions, including one-part designs, uni-body constructions, and their like, as known in the exterior mirror assembly art. The concepts of the invention are also applicable to a variety of assemblies including assemblies that use a bracket as a distinct internal structure and assemblies that do not use a bracket but rather are bracket-less assemblies where the housing itself serves as a structural element with means such as on the walls of the housing for securing an actuator and for receiving a light module.

[0033] In addition, the signal light modules of the present invention may incorporate a security light. For example, referring to Fig. 4, a signal light module 416"', which is of similar construction to signal light module 416, incorporates a security light module 516'. Security light module 516' is of similar construction to security light modules 516 or 616. In the illustrated embodiment, security module 516' is mounted to the lower wall of signal light module 416"' and projects a light pattern 517' similar to light pattern 517. It should be understood that the location of security light module 516' within signal light module 416"' is just one exemplary illustration and that other locations within signal light module 416"' are also contemplated. Furthermore, the optics of security light module 516' may be adjusted, as would be understood, to accommodate the numerous other desirable locations within signal light assembly 416"' to provide similar light patterns as described in further detail in reference to the previous embodiments. In preferred form, the signal light modules (or security light modules or combined security light/tum signal light modules) complete or form the lower portion of the exterior mirror housing. In this manner, the signal light modules may be easily removed for replacement or service. Also, the signal light modules may also include other lighting features, such as ground illumination lights which are activated when the door is opened, such as when the key is inserted into the door lock or when remotely unlocked by an electronic key or by voice activation, or when the car is approached by a person as detected, for example, by a proximity detector system. Other features which may be incorporated or combined with the signal light modules and security light modules include: blind spot detectors; sensors, for example control sensors for control circuits including control circuits for electrochromic elements, temperature sensors for controls or indicators, heading sensors; intelligent highway control sys-

tems (IHCS); intrusion detectors; antennas, such as a GPS antenna, car phone antennas, radio antenna, and the like; microphones; speakers; garage door opener transmitters and antennas; an automatic toll booth payment system, such as a PASS ® system; transceivers; a node and/or controller for a vehicle multiplex and/or car area network; a remote transaction system; or telecommunication devices, such as ONSTAR ® found in General Motor vehicles of Detroit, Michigan, or RESCU ® available from Ford Motor Company of Detroit, Michigan. Such remote transaction systems may, for example, include such remote transaction systems described in U.S. patent No. US6,158,655, commonly assigned to Donnelly Corporation of Holland, Michigan. Further features may include providing the exterior mirror systems with plug-in electrical connectors, which permit the security light modules and signal light modules of the present invention to be easily and quickly plugged in to the exterior mirror assembly without the need for extra wiring (such as wire harnesses, cables, and the like). Examples of suitable plug-in electrical connectors are shown in U.S. Patent No. US6,007,222, which is commonly assigned to Donnelly Corporation of Holland, Michigan.

[0034] In addition, the signal light modules of the present invention may include incorporated therein one or more cameras. These cameras may be forward and/or rearward facing depending on the application. For example, cameras may be used as a part of a headlamp control system, such as disclosed in U.S. Patent No. 5,796,094, a rearview vision system for vehicles, such as disclosed in U.S. Patent No. 5,670,935 and in PCT Publication No. 96/38319, an image capture system, such as disclosed in European patent application No. EP1,004,916A1, all commonly assigned to Donnelly Corporation of Holland, Michigan. In addition, the cameras may be supplied with an electrochromic filter.

[0035] In preferred form, both the signal light modules and security light modules are detachable so that they can either be replaced as a whole unit or serviced with individual components of the respective modules being detachable for repair or replacement. In some applications, it may be more commercially attractive to make the whole module replaceable as a unit rather than the individual components. In other instances, it may be more commercially attractive to make some or all the individual components replaceable or serviceable, for example the bulb or bulbs may be individually replaceable. In addition, both or either the signal lights and security lights may be used as a marker or location indicator, such as a car find feature, with the lights being actuated, for example, by a key fob, to flash for intervals, for example, one second intervals, five second intervals, or 15 intervals, or the like. However, when the signal light or security light is used for this feature, it is preferred that this marker function is locked out when the vehicle is operating, for example by using a lock-out circuit.

[0036] In order to minimize exposure to moisture and

other elements, the signal light modules and security light modules of the present invention may be fabricated as water impervious modules. The modules may include one or more moisture escape routes, for example ports with covers that permit egress of moisture from the module but restrict moisture ingress. One example of such a cover is a patch of a semi-permeable membrane, such as GORTEX ®. Alternately, the modules may include a drain to permit moisture to drain from the module.

[0037] While several forms of the invention have been shown and described, other forms will now become apparent to those skilled in the art. For example, the signal light assembly (416) may project a white light or other colored light including a red light or a blue light (such as could be generated by a blue LED or blue phosphor). Likewise, the security light module (516') may project a colored light, such as an amber light or a red light as desired.

Claims

1. An exterior mirror system for a vehicle (40) comprising:

an exterior mirror assembly (410) including a reflective element (414), a housing (412) for said reflective element, and a positioning device (318) for adjustably positioning said reflective element in said housing, said exterior mirror assembly being adapted to mount to the vehicle, and said exterior mirror assembly further including at least one signal light (416), said signal light having at least one light source (432) and a light conducting member (430), said light conducting member being oriented for facing at least rearward of the vehicle and being adapted to project a pattern of light from said exterior mirror assembly and to restrict light from extending into the vehicle so that a driver seated in the vehicle does not directly observe said pattern of light, said pattern of light extending at least rearwardly and laterally from the vehicle to provide a side marker for the vehicle, **characterised in that** said light conducting member includes a plurality of light conducting portions (430a) spaced and arranged in a generally radial fashion, each of said light conducting portions including a leading edge (434) defining a light input surface receiving light from said at least one light source, each of said light conducting portions having an outboard end (436) defining a light emitting surface and said outboard ends following the contour of said housing.

2. The exterior mirror system of Claim 1, wherein each of said light conducting portions includes light re-

- flecting surfaces (438,440), said light reflecting surfaces being arranged to reflect light from said at least one light source through said light emitting surfaces of said light conducting portions in said light pattern.
3. The exterior mirror system of Claim 2, wherein said light pattern includes a plurality of light regions, each of said light regions having a first leading edge generally parallel with said vehicle and a second leading edge generally angled away from said vehicle.
 4. The exterior mirror system of Claim 1, wherein said light conducting member is positioned below said reflective element in said exterior mirror assembly.
 5. The exterior mirror system of Claim 1, wherein said signal light includes a plurality of light sources (432), each of said light sources being associated with a respective light conducting portion and being positioned to direct light into said respective light conducting portion through a respective light input surface.
 6. The exterior mirror system of Claim 1, wherein said light conducting member comprises a unitary light conducting member.
 7. The exterior mirror system according to Claim 1, wherein said housing (412) includes a front facing portion (431'), said front facing portion facing the forward direction of the vehicle, and said light conducting member including at least one light emitting surface positioned in said front facing portion and directing light at least forwardly and laterally of the vehicle.
 8. The exterior mirror system according to Claim 1, wherein said light conducting member wraps around said housing for directing light laterally with respect to the vehicle for providing the side marker for the vehicle.
 9. The exterior mirror system according to Claim 1, wherein said light conducting member is adapted to redirect said light from said at least one light source in a direction outwardly from said housing through said light emitting surfaces to produce a light pattern forwardly, rearwardly, and laterally from the vehicle and to restrict light from entering into the vehicle so that the driver of the vehicle does not directly observe said light pattern.
 10. The exterior mirror system of Claim 9, wherein at least two of said light emitting surfaces (436) are contiguous and comprise a unitary light emitting surface.
 11. The exterior mirror system according to Claim 1, wherein said light source comprises a plurality of light sources (432), each of said light sources corresponding to a respective light input surface of a respective light conducting portion.
 12. The exterior mirror system according to Claim 1, wherein said light conducting member is positioned below said reflective element in said housing.
 13. The exterior mirror system according to Claim 1, further comprising a signal light housing, said light conducting member being positioned in said signal light housing.
 14. The exterior mirror system according to Claim 13, wherein said light conducting member and said signal light housing are integrally formed.
 15. The exterior mirror system according to Claim 13, wherein an outer surface of said signal light housing is generally flush with an outer surface of said mirror housing.
 16. The exterior mirror system according to Claim 10, wherein said radially spaced conducting portions are interconnected at their respective distal ends wherein said light emitting surfaces define a unitary light emitting surface.
 17. The exterior mirror system according to Claim 13, wherein said exterior mirror assembly includes at least one security light (516), said security light being adapted to project a pattern of light from said exterior mirror assembly to create a lighted security zone (517) in an area adjacent the vehicle.
 18. The exterior mirror system of Claim 17, wherein said security light is positioned in said signal light housing.
 19. The exterior mirror system of Claim 17, wherein said security light has a security light housing (518), a light source (520), a light reflecting member (522) supported in said security light housing, and a cover (524), said light reflecting member directing light from said light source through said cover.
- Patentansprüche**
1. Außenspiegelsystem für ein Fahrzeug (40), umfassend:
 - eine Außenspiegelbaugruppe (410), die ein reflektierendes Element (414), ein Gehäuse (412) für das genannte reflektierende Element, und eine Positionierungseinrichtung (318) zum

- einstellenden Positionieren des genannten reflektierenden Elements in dem genannten Gehäuse einschließt, wobei die genannte Außenspiegelbaugruppe für Anbringung an dem Fahrzeug ausgelegt ist und die genannte Außenspiegelbaugruppe ferner mindestens ein Signallicht (416) einschließt und das genannte Signallicht mindestens eine Lichtquelle (432) und ein lichtleitendes Element (430) aufweist, wobei das genannte lichtleitende Element ausgerichtet ist, um zumindest nach hinten von dem Fahrzeug gerichtet zu sein, und ausgelegt ist, um ein Lichtmuster von der genannten Außenspiegelbaugruppe zu projizieren und Licht gegen Ausbreitung in das Fahrzeug einzuschränken, so dass ein in dem Fahrzeug sitzender Fahrer nicht direkt das Lichtmuster betrachtet, wobei das genannte Lichtmuster sich zumindest nach hinten und zur Seite von dem Fahrzeug erstreckt, um eine Seitenmarkierung für das Fahrzeug zu liefern, **dadurch gekennzeichnet, dass** das lichtleitende Element eine Mehrzahl lichtleitender Abschnitte (430a) einschließt, die in einer allgemein radialen Weise verteilt und anordnet sind, wobei jeder genannte lichtleitende Abschnitt eine Führungskante (434) einschließt, die eine Lichteingangsfläche begrenzt, welche Licht von der genannten mindestens einen Lichtquelle empfängt, und jeder der genannten lichtleitenden Abschnitte ein Außenende (436) aufweist, das eine lichtemittierende Oberfläche begrenzt und die genannte Außenenden der Kontur des genannten Gehäuses folgen.
2. Außenspiegelsystem nach Anspruch 1, bei dem jeder der genannten lichtleitenden Abschnitte lichtreflektierende Oberflächen (438, 440) einschließt, wobei die genannten lichtreflektierenden Oberflächen angeordnet sind, um Licht von der genannten mindestens einen Lichtquelle durch die genannten lichtemittierenden Oberflächen der genannten lichtleitenden Abschnitte in dem genannten Lichtmuster zu reflektieren.
 3. Außenspiegelsystem nach Anspruch 2, bei dem das genannte Lichtmuster eine Mehrzahl von Lichtbereichen einschließt, wobei jeder der genannten Lichtbereiche eine erste Vorderkante, die allgemein parallel zu dem genannten Fahrzeug ist, und eine zweite Vorderkante aufweist, die allgemein von dem genannten Fahrzeug weg abgewinkelt ist.
 4. Außenspiegelsystem nach Anspruch 1, bei dem das genannte lichtleitende Element unter dem genannten reflektierenden Element in der genannten Außenspiegelbaugruppe angeordnet ist.
 5. Außenspiegelsystem nach Anspruch 1, bei dem das genannte Signallicht eine Mehrzahl von Lichtquellen (432) einschließt, wobei jede der genannten Lichtquellen mit einem jeweiligen lichtleitenden Abschnitt verknüpft ist und positioniert ist, um Licht in den genannten jeweiligen lichtleitenden Abschnitt durch eine jeweilige Lichteingangsfläche zu leiten.
 6. Außenspiegelsystem nach Anspruch 1, bei dem das genannte lichtleitende Element ein unitäres lichtleitendes Element aufweist.
 7. Außenspiegelsystem nach Anspruch 1, bei dem das genannte Gehäuse (412) einen nach vorne gerichteten Abschnitt (431') einschließt, wobei der genannte nach vorne gerichtete Abschnitt in die Vorwärtsrichtung des Fahrzeugs gerichtet ist, und das genannte lichtleitende Element mindestens eine lichtemittierende Oberfläche einschließt, die in dem genannten nach vorne gerichteten Abschnitt positioniert ist und Licht zumindest nach vorne und zur Seite des Fahrzeugs leitet.
 8. Außenspiegelsystem nach Anspruch 1, bei dem das genannte lichtleitende Element um das genannte Gehäuse gewickelt ist, um Licht zur Seite in bezug zum Fahrzeug zum Liefern einer Seitenmarkierung für das Fahrzeug zu leiten.
 9. Außenspiegelsystem nach Anspruch 1, bei dem das genannte lichtleitende Element ausgelegt ist, um das genannte Licht von der genannten mindestens einen Lichtquelle in einer Richtung nach außen von dem genannten Gehäuse durch die genannten lichtemittierten Oberfläche umzuleiten, um ein Lichtmuster nach vorn, nach hinten und zur Seite des Fahrzeugs zu erzeugen, und Licht gegen Eindringung in das Fahrzeug einzuschränken, so dass der Fahrer des Fahrzeugs nicht direkt das genannte Lichtmuster betrachtet.
 10. Außenspiegelsystem nach Anspruch 9, bei dem mindestens zwei der genannten lichtemittierenden Oberflächen (436) aneinander stoßen und eine unitäre lichtemittierende Oberfläche aufweisen.
 11. Außenspiegelsystem nach Anspruch 1, bei dem die genannte Lichtquelle eine Mehrzahl von Lichtquellen (432) aufweist, wobei jede der genannten Lichtquellen einer jeweiligen Lichteingangsfläche eines jeweiligen lichtleitenden Abschnitts entspricht.
 12. Außenspiegelsystem nach Anspruch 1, bei dem das lichtleitende Element unter dem genannten reflektierenden Element in dem genannten Gehäuse positioniert ist.

13. Außenspiegelsystem nach Anspruch 1, das ferner ein Signallichtgehäuse aufweist, wobei das genannte lichtleitende Element in dem genannten Signallichtgehäuse positioniert ist.

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14. Außenspiegelsystem nach Anspruch 13, bei dem das genannte lichtleitende Element und das genannte Signallichtgehäuse integriert ausgebildet sind.

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15. Außenspiegelsystem nach Anspruch 13, bei dem eine Außenfläche des genannten Signallichtgehäuses allgemein bündig mit einer Außenfläche des genannten Spiegelgehäuses ist.

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16. Außenspiegelsystem nach Anspruch 10, bei dem die genannten radial verteilten leitenden Abschnitte an ihren jeweiligen distalen Enden miteinander verbunden sind, wobei die lichtemittierenden Oberflächen eine unitäre lichtemittierende Oberfläche definieren.

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17. Außenspiegelsystem nach Anspruch 13, bei dem die genannte Außenspiegelbaugruppe mindestens ein Sicherheitslicht (516) einschließt, und das genannte Sicherheitslicht ausgelegt ist, um ein Lichtmuster von der genannten Außenspiegelbaugruppe zum Erzeugen einer beleuchteten Sicherheitszone (517) in einem Bereich angrenzend an das Fahrzeug zu projizieren.

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18. Außenspiegelsystem nach Anspruch 17, bei dem das genannte Sicherheitslicht in dem genannten Signallichtgehäuse positioniert ist.

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19. Außenspiegelsystem nach Anspruch 17, bei dem das genannte Sicherheitslicht ein Sicherheitslichtgehäuse (518), eine Lichtquelle (520), ein lichtreflektierendes Element (522) gehalten in dem genannten Sicherheitslichtgehäuse und eine Abdeckung (524) aufweist, wobei das genannte lichtreflektierende Element Licht von der genannten Lichtquelle durch die genannte Abdeckung leitet.

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Revendications

1. Un système de rétroviseur extérieur pour un véhicule (40) comprenant :

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un ensemble rétroviseur extérieur (410) incluant un élément réflecteur (414), un boîtier (412) pour ledit élément réflecteur et un dispositif de positionnement (318) pour le positionnement ajustable dudit élément réflecteur dans ledit boîtier, ledit ensemble rétroviseur extérieur étant adapté pour être monté sur le véhicule, et ledit ensemble rétroviseur extérieur in-

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cluant en plus au moins un signal lumineux (416), ledit signal lumineux ayant au moins une source lumineuse (432) et un élément de conduit de lumière (430), ledit élément de conduit de lumière étant orienté pour faire face au moins à l'arrière du véhicule et étant adapté pour projeter un motif de lumière depuis ledit ensemble rétroviseur extérieur et pour limiter la lumière de s'étendre dans le véhicule de sorte qu'un conducteur assis dans le véhicule n'observe pas directement ledit motif de lumière, ledit motif de lumière s'étendant au moins vers l'arrière et latéralement depuis le véhicule pour fournir un repère latéral pour le véhicule, **caractérisé en ce que** ledit élément de conduit de lumière inclut une pluralité de parties de conduit de lumière (430a) espacées et agencées de manière généralement radiales, chacune desdites parties de conduit de lumière incluant un bord d'attaque (434) définissant une surface d'entrée de lumière recevant de la lumière de ladite au moins une source lumineuse, chacune desdites parties de conduit de lumière ayant une extrémité extérieure (436) définissant une surface émettant la lumière et lesdites extrémités extérieures suivant le contour dudit boîtier.

2. Le système de rétroviseur extérieur de la revendication 1, où chacune desdites parties de conduit de lumière inclut des surfaces réfléchissant la lumière (438, 440), lesdites surfaces réfléchissant la lumière étant agencées pour refléter la lumière depuis ladite au moins une source lumineuse à travers lesdites surfaces émettant la lumière desdites parties de conduit de lumière dans ledit motif de lumière.

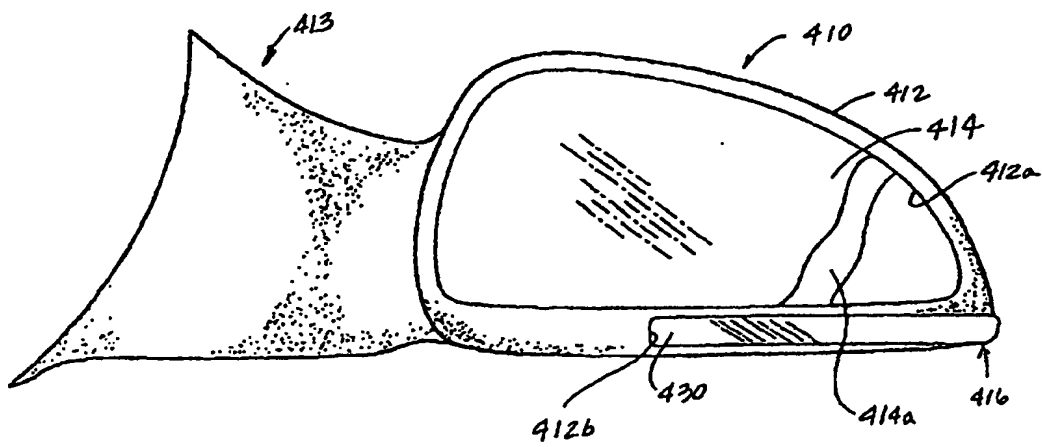
3. Le système de rétroviseur extérieur de la revendication 2, où ledit motif de lumière inclut une pluralité de régions lumineuses, chacune desdites régions lumineuses ayant un premier bord d'attaque généralement parallèle audit véhicule et un deuxième bord d'attaque généralement s'écartant en biais dudit véhicule.

4. Le système de rétroviseur extérieur de la revendication 1, où ledit élément de conduit de lumière est positionné sous ledit élément réflecteur dans ledit ensemble rétroviseur extérieur.

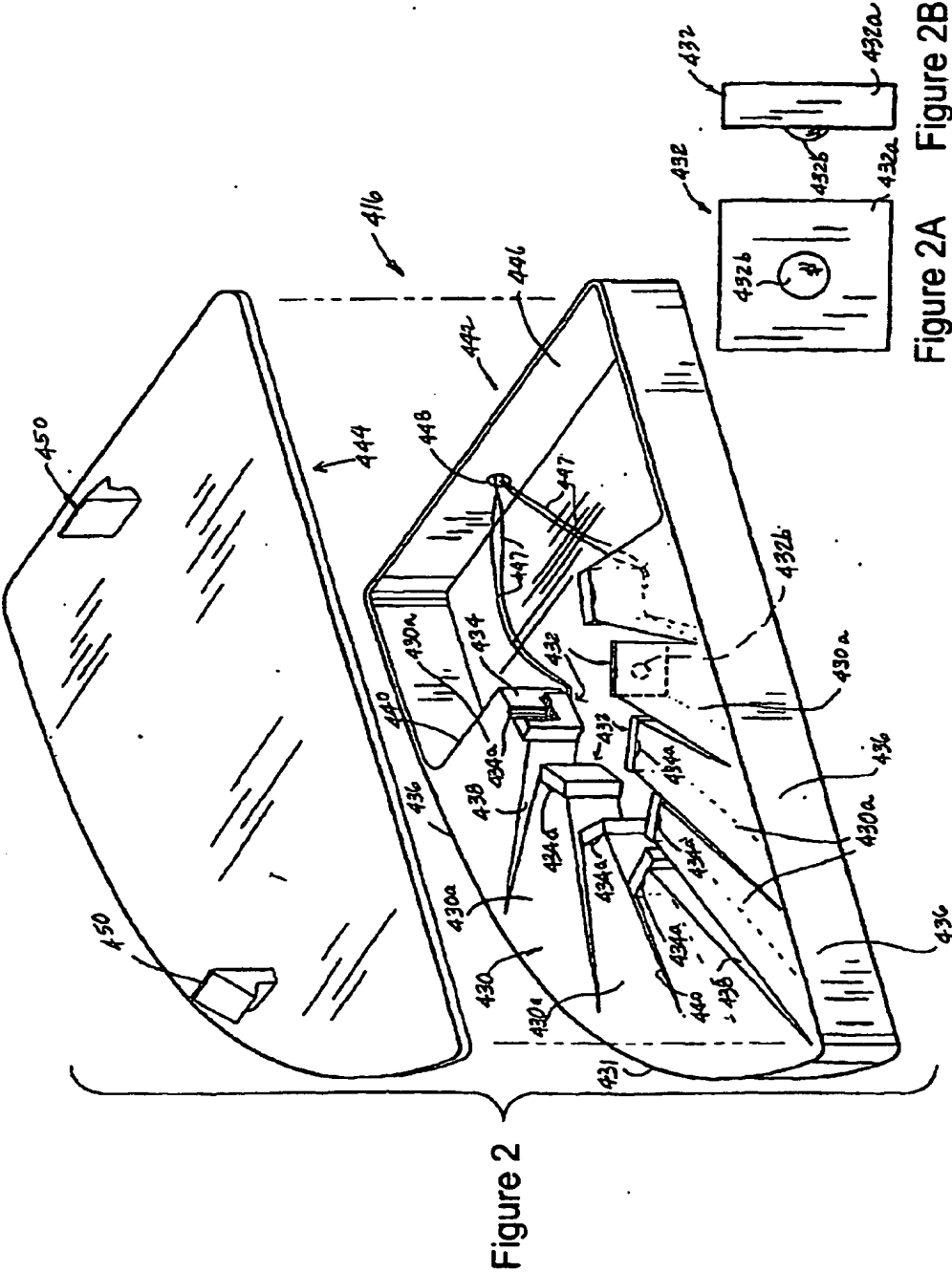
5. Le système de rétroviseur extérieur de la revendication 1, où ledit signal lumineux inclut une pluralité de sources lumineuses (432), chacune desdites sources lumineuses étant associée à une partie de conduit de lumière respective et étant positionnée pour diriger la lumière dans ladite partie de conduit de lumière respective à travers une surface d'entrée de lumière respective.

6. Le système de rétroviseur extérieur de la revendication 1, où ledit élément de conduit de lumière comprend un élément de conduit de lumière unitaire.
7. Le système de rétroviseur extérieur selon la revendication 1, où ledit boîtier (412) inclut une partie face à l'avant (431'), ladite partie face à l'avant faisant face au sens avant du véhicule, et ledit élément de conduit de lumière incluant au moins une surface émettant la lumière positionnée dans ladite partie face à l'avant et dirigeant la lumière au moins vers l'avant et latéralement depuis le véhicule.
8. Le système de rétroviseur extérieur selon la revendication 1, où ledit élément de conduit de lumière s'enroule autour dudit boîtier pour diriger la lumière latéralement par rapport au véhicule pour fournir un repère latéral au véhicule.
9. Le système de rétroviseur extérieur selon la revendication 1, où ledit élément de conduit de lumière est adapté pour renvoyer ladite lumière depuis ladite au moins une source lumineuse dans un sens vers l'extérieur depuis ledit boîtier à travers lesdites surfaces émettant la lumière pour produire un motif de lumière vers l'avant, vers l'arrière et latéralement depuis le véhicule et pour limiter l'entrée de la lumière dans le véhicule de sorte que le conducteur du véhicule n'observe pas directement ledit motif de lumière.
10. Le système de rétroviseur extérieur de la revendication 9, où au moins deux desdites surfaces émettant la lumière (436) sont contiguës et comprennent une surface unitaire émettant la lumière.
11. Le système de rétroviseur extérieur selon la revendication 1, où ladite source lumineuse comprend une pluralité de sources lumineuses (432), chacune desdites sources lumineuses correspondant à une surface d'entrée de lumière respective d'une partie de conduit de lumière respective.
12. Le système de rétroviseur extérieur selon la revendication 1, où ledit élément de conduit de lumière est positionné sous ledit élément réflecteur dans ledit boîtier.
13. Le système de rétroviseur extérieur selon la revendication 1, comprenant en plus un boîtier de signal lumineux, ledit élément de conduit de lumière étant positionné dans ledit boîtier de signal lumineux.
14. Le système de rétroviseur extérieur selon la revendication 13, où ledit élément de conduit de lumière et ledit boîtier de signal lumineux sont formés intégralement.
15. Le système de rétroviseur extérieur selon la revendication 13, où une surface extérieure dudit boîtier de signal lumineux affleure généralement avec une surface extérieure dudit boîtier de rétroviseur.
16. Le système de rétroviseur extérieur selon la revendication 10, où lesdites parties de conduit espacées radialement sont interconnectées à leurs extrémités distales respectives où lesdites surfaces émettant la lumière définissent une surface unitaire émettant la lumière.
17. Le système de rétroviseur extérieur selon la revendication 13, où ledit ensemble rétroviseur extérieur inclut au moins une lumière de sécurité (516), ladite lumière de sécurité étant adaptée pour projeter un motif de lumière depuis ledit ensemble rétroviseur extérieur pour créer une zone de sécurité éclairée (517) dans un espace adjacent au véhicule.
18. Le système de rétroviseur extérieur de la revendication 17, où ladite lumière de sécurité est positionnée dans ledit boîtier de signal lumineux.
19. Le système de rétroviseur extérieur de la revendication 17, où ladite lumière de sécurité a un boîtier de lumière de sécurité (518), une source lumineuse (520), un élément réfléchissant la lumière (522) soutenu dans ledit boîtier de lumière de sécurité et un couvercle (524), ledit élément réfléchissant la lumière dirigeant la lumière depuis ladite source lumineuse à travers ledit couvercle.

Figure 1



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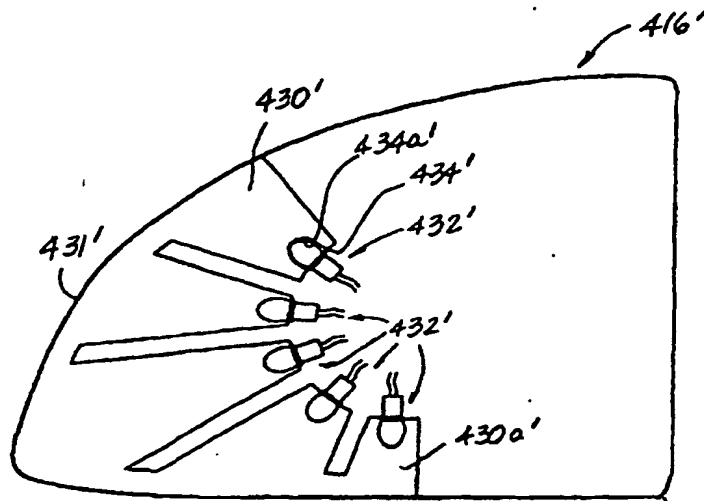


Figure 3A

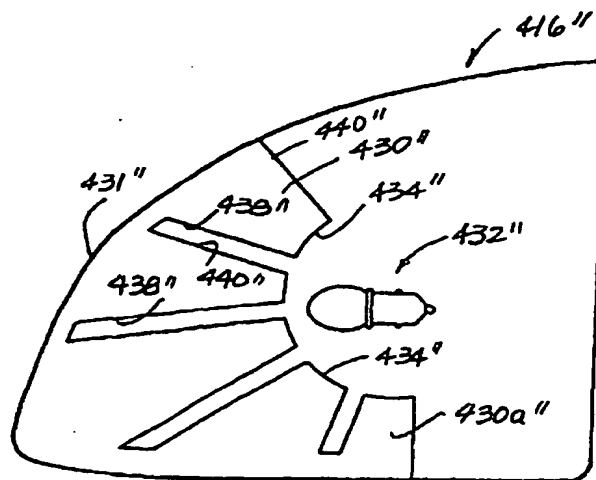


Figure 3B

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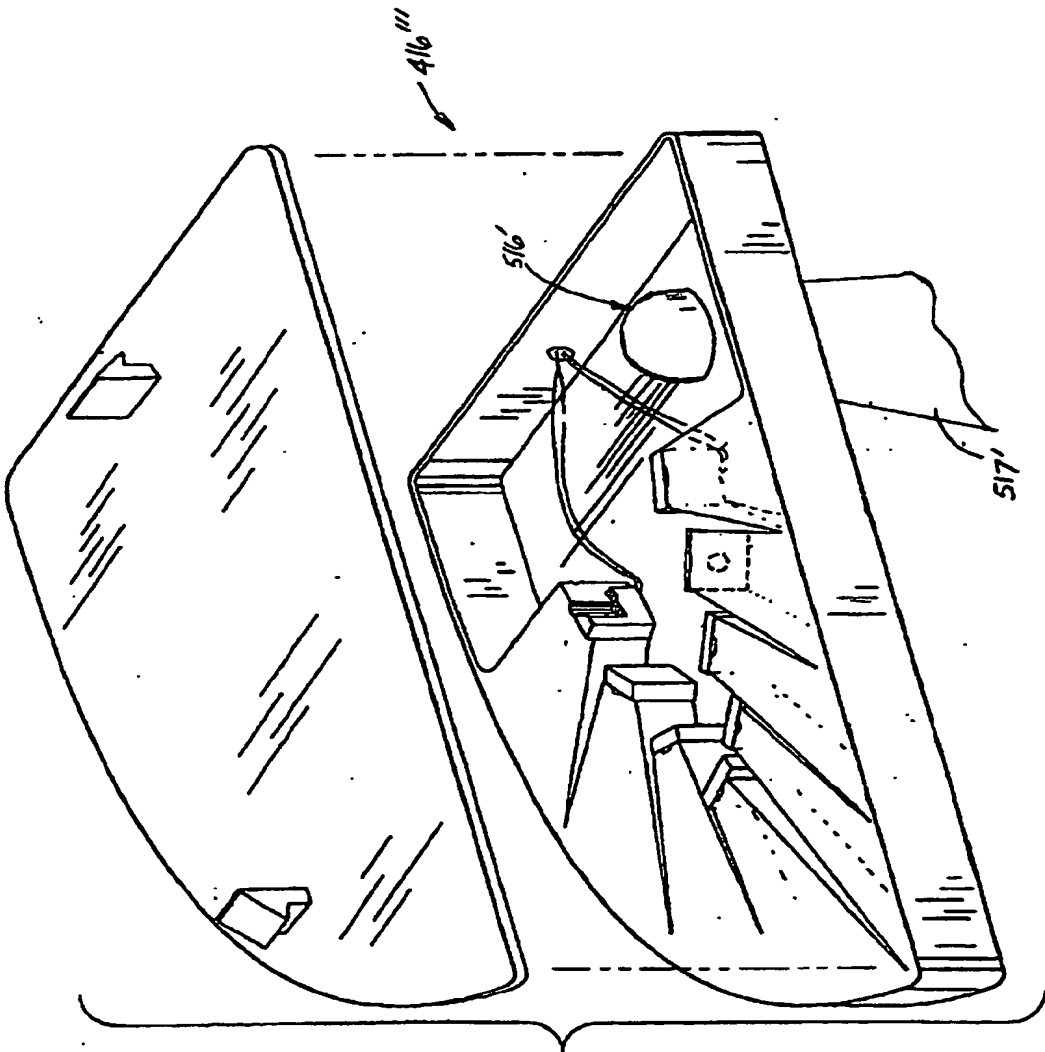


Figure 4

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